**Work Load**
Approximately 140 hours corresponding to 5 ECTS points, including the period at DTU, preparatory reading given before the course, and completion of an individual report after the course.

**Study Materials**
Notes will be provided before the course.

**Evaluation and Diplomas**
Diplomas will be issued based on active participation in the entire course.

**Participants**
The participants are expected to have basic knowledge of electrochemistry. Maximum number of course participants is 30.
All lectures will be given in English.

**Costs**
A course fee of EUR 250 will apply for the entire course, and the fee of single-day participation will be EUR 80. The students will be responsible for travel, meals and accommodation.

**Accommodation**
A list of hotels in the vicinity of DTU will be provided.
Social activities during the course are planned to promote a stimulating study atmosphere.

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**Further Information and Registration** *(before October 1, 2012)*
Judith Selk Albetsen, Doctoral Course Secretary
Department of Civil Engineering
Technical University of Denmark
Brovej, Building 118
DK-2800 Kgs. Lyngby, Denmark
E-mail: JSA@byg.dtu.dk

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**Organizers**
Lisbeth M. Ottosen and Pernille E. Jensen
Technical University of Denmark

Marta Castellote
Institute of Construction Science Eduardo Torroja, Spain

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**Lyngby, Denmark**
**November 5-9, 2012**

**Electrokinetics in Civil and Environmental Engineering**
**Scope of Course**

Electrokinetics inclusive electromigration are powerful tools for removal and supply of matter into or out from porous materials. Electrokinetic transport processes are utilized in civil engineering for repair and maintenance purposes and in environmental engineering for contaminant removal.

The two most well-known methods are chloride extraction from concrete and soil remediation, respectively, but there are also other applications within both engineering fields. Even though there are many topics of common interest there is no tradition for interdisciplinary collaboration between researchers.

The present Ph.D. course aims at bringing Ph.D. students from civil engineering and environmental engineering together in order to utilize the synergy. The course provides up to date knowledge and discuss major scientific issues for utilization of electrokinetic processes in porous and particulate materials.

**Topics**

- Chloride extraction from concrete
- Re-alkalization of concrete
- Cathodic protection
- Desalination of masonry
- Re-impregnation of wood in structures
- Remediation of soil polluted with heavy metals and organic compounds
- Heavy metal removal from fly ash, sludge ash and harbor sediment
- Electrodes and electrode processes
- Modeling transport processes

**Lectures**

- **Akram Alshawabkeh**, Northeastern University, USA
- **Birit Buhr Jensen**, COWI, Denmark
- **Gunvor M. Kirkelund**, Department of Civil Engineering, Technical University of Denmark
- **Juan M. Paz-Garcia**, Department of Civil Engineering, Technical University of Denmark
- **Lisbeth M. Ottosen**, Department of Civil Engineering, Technical University of Denmark
- **Lukas Y. Wick**, Helmholtz Centre for Environmental Research, Germany
- **Marta Castellote**, Institute of Construction Sciences “Eduardo Torroja” (IETcc), Spain
- **Mette R. Geiker**, Department of Structural Engineering, Norwegian University of Science and Technology, Norway
- **Pernille E. Jensen**, Department of Civil Engineering, Technical University of Denmark
- **Reinout Lageman**, Lambda Consult, Holland
- **Ulrich Schneck**, CITec Concrete Improvement Technologies, GmbH, Germany